

FACULTAD DE INGENIERÍA

Escuela Académico Profesional de Ingeniería Industrial

Tesis

**Implementation of an Alarm System to Protect a
Submersible Pump of a Company in Cusco, 2023**

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ABSTRACT

The implementation of an alarm system was carried out to protect a submersible pump whose purpose is to maintain the river water supply of a company in Cusco. The guidelines of the PM-BOK, which is the main book of the PMI, were used. Within the development of the project, there are 5 phases: initiation, planning, execution, monitoring-control, and finally, closure. In the initial phase, interested parties will be determined, and the project charter will be drafted. In the planning phase, requirements gathering, design, analysis, risk management, and project schedule will be carried out. The execution phase will be carried out within the agreement with the interested parties, where the implementation of the project itself will be developed under the supervision of the project director. Progress in the monitoring and control phase will be monitored and controlled according to the schedule. Finally, in the Closing phase, what was requested by the interested parties can be compared with the final results. According to the results obtained in the initiation and planning phase, it is evident that there will be better remote control and monitoring of the submersible pump alarm system, minimizing unexpected stops. Therefore, it is concluded that by using Logo Soft Comfort tools such as Logo Web Editor and Logo Access Tool, monitoring and control screens can be developed and alarm reports generated to make assertive decisions, either for preventive or corrective maintenance of equipment, thus minimizing unwanted events that could affect the water supply from the river to the plant.

CCS CONCEPTS

• Software and its engineering → Software notations and tools; Software configuration management and version control systems.

KEYWORDS

Industrial automation, Programmable logic controller, monitoring and control, PLC, Logo

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1 INTRODUCTION

Industrial automation went through two stages: A logic based on the implementation of relays, timers, and counters, also called relay logic, which was characterized by its high price, as well as its delay in being implemented, and on the other hand, a logic based on PLC (programmable logic controller) also called ladder logic that will minimize the limitations of the relay logic [1]. Currently, the company in Cusco has a protection system for a submersible pump in the river made up of a so-called thermal overload relay. This system has a control philosophy supported by relay logic and supervised by a field operator.

The problem arises when, for some reason, the pump stops and the operator is not aware of it because there is no audible alarm; this can result in a shortage of water from the river to the plant. Based on what has been described above, it is intended to implement an audible alarm system that allows the field operator to be notified of the reason for the stoppage, recognize the alarm, fix the defect, and thereby maintain the water supply through the use of a programmable logic controller taking advantage of the benefits of industrial automation.

Mejía et al. [1] aim to configure the various electronic devices connected in a network through multiple Web communication protocols such as WS, REST, and SOAP to satisfy business needs. It will also allow the systems to be agile and easily scalable. Alcocer et al. [2] aim to investigate the technology that the company Servipaxa currently has in its production processes for banana covers and to be able to provide them with an improvement proposal based on programmable equipment that contributes favorably concerning their current situation.

Jiménez [3] proposes stabilizing the suction and discharge pressure variation at the Andoas pumping station immediately by implementing a control system based on a programmable logic controller and a SCADA system. Coronado [4] proposes the selection and maintenance of an oil measurement unit as its objective to correct human and mechanical errors when carrying out automatic inspection of oil production.